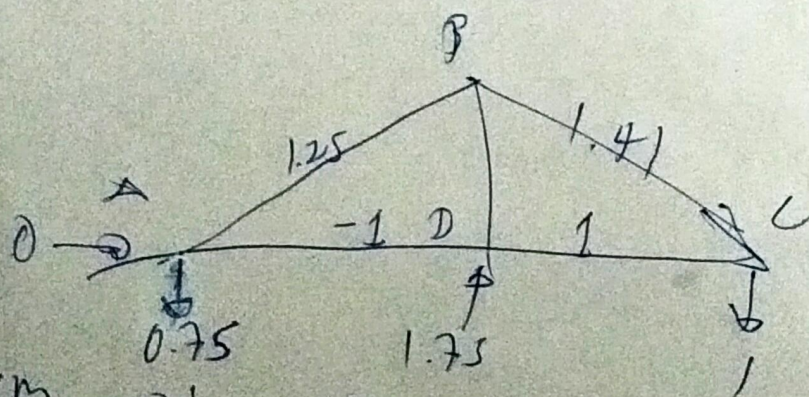
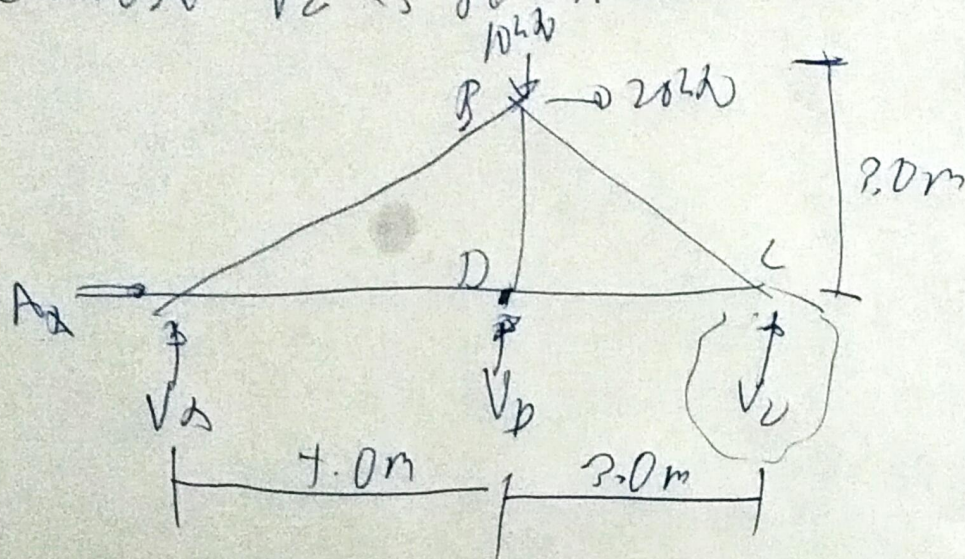


Dr. Zaid Alkhatib Villanova

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CESTRUC knowledge check quiz

Choose $V_c < 5$ lb/in

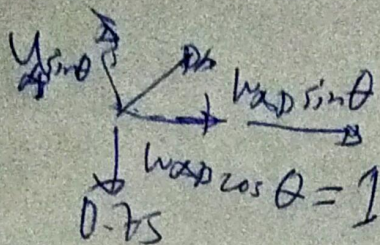


$$\sum M_D = 0: -V_A(4.0) + 1(3.0) = 0$$

$$V_A = 0.75$$

$$\sum F_y = 0: -0.75 + B_V - 1 = 0 \Rightarrow B_V = 1.75$$

Q7 A.



$\theta =$

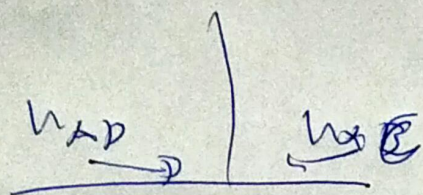
$\sum F_y = 0$

$$-0.75 + \frac{3}{5} W_{AD} \sin \theta = 0$$

$$W_{AD} = 1.25$$

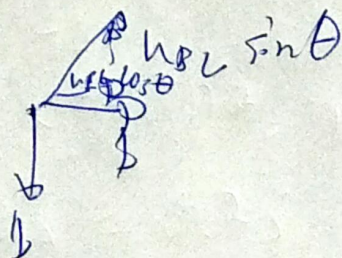
$$\Rightarrow U_{AD} = -1$$

Q7 D



$$\sum F_y = 0 \Rightarrow 1 - W_{AD} = 0 \Rightarrow W_{AD} = 1$$

Q7 E



$\sum F_y = 0$

$$W_{D2} \sin \theta - 1 = 0$$

$$W_{D2} = \frac{1}{\sin \theta} = \sqrt{2} = 1.41$$

member	L	EA	P	u	uP/EA
AB	8000	1×10^5	2.15	1.25	
BC	4243	10277	-20.30	1.41	
AD	4000		14.25	-1	
CD	3000		14.25	1	
BD	3000		0.00	-1.25	

member	uPL/EA

$$V_D = -\frac{\Delta_C}{\delta_C} = 2.75 \text{ kN}$$

downwards

$$V_D = 2.75 \text{ kN downwards}$$

$$P_D = P \times u \times V_D$$

member	Internal force
AB	10.64 kN (T)
BC	16.27 kN (C)
AD	11.50 kN (T)
CD	17.08 kN (T)
BD	4.80 kN (C)